hp ProLiant Storage Server

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This guide provides information on installing and initially configuring HP ProLiant Storage Servers.

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Contents

Intended audience

This book is intended for use by technical professionals who are experienced with the following:

- Microsoft® administrative procedures
- File-sharing protocols

Prerequisites

Before you set up the HP ProLiant Storage Server, HP recommends that you obtain supplemental documentation relative to the items listed above in the section titled "Intended Audience."

Related documentation

In addition to this guide, HP provides corresponding information:

- *HP ProLiant Storage Server Administration Guide*
- *HP ProLiant Storage Server Release Notes*

Conventions

Conventions consist of the following:

- Document conventions
- Text symbols

Document conventions

This document follows the conventions in Table 1.

Table 1: Document conventions

Convention	Element
Blue text: Figure 1	Cross-reference links
Bold	Menu items, buttons, and key, tab, and box names
Italics	Text emphasis and document titles in body text
`Monospace font`	User input, commands, code, file and directory names, and system responses (output and messages)
`Monospace, italic font`	Command-line and code variables
Blue underlined sans serif font text (http://www.hp.com)	Web site addresses

Text symbols

The following symbols may be found in the text of this guide. They have the following meanings:

> **WARNING:** Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or death.

> **Caution:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or data.

> **Tip:** Text in a tip provides additional help to readers by providing nonessential or optional techniques, procedures, or shortcuts.

> **Note:** Text set off in this manner presents commentary, sidelights, or interesting points of information.

Equipment symbols

The following equipment symbols may be found on hardware for which this guide pertains.

Any enclosed surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

WARNING: To reduce the risk of personal injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. Contact with this surface could result in injury.

WARNING: To reduce the risk of personal injury from a hot component, allow the surface to cool before touching.

Power supplies or systems marked with these symbols indicate the presence of multiple sources of power.

WARNING: To reduce the risk of personal injury from electrical shock, remove all power cords to completely disconnect power from the power supplies and systems.

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manually handling material.

Getting help

If you still have a question after reading this guide, contact an HP authorized service provider or access our web site: http://www.hp.com.

HP technical support

Telephone numbers for worldwide technical support are listed on the following HP web site: http://www.hp.com/support/. From this web site, select the country of origin.

Note: For continuous quality improvement, calls may be recorded or monitored.

Be sure to have the following information available before calling:

■ Technical support registration number (if applicable)

■ Product serial numbers

■ Product model names and numbers

■ Applicable error messages

■ Operating system type and revision level

■ Detailed, specific questions

HP storage web site

The HP web site has the latest information on this product, as well as the latest drivers. Access storage at: http://www.hp.com/country/us/eng/prodserv/storage.html. From this web site, select the appropriate product or solution.

HP authorized reseller

For the name of your nearest HP authorized reseller:

■ In the United States, call 1-800-282-6672

■ In Canada, call 1-800-863-6594

■ Elsewhere, see the HP web site for locations and telephone numbers: http://www.hp.com.

Overview

1

This guide provides basic instructions for installing and initially configuring HP ProLiant Storage Servers. The basic steps are:

1. **Setup the hardware**.

    Refer to the HP ProLiant Storage Server installation poster for model-specific information.

2. **Collect configuration information**.

    See Table 2, in chapter 2 of this guide.

3. **Use one of the following methods to initialize the storage server and identify the configuration parameters:**

    ■ RapidLaunch

    ■ Remote browser

    ■ Direct attach

    See chapter 2 of this guide.

4. **Use the Rapid Startup Wizard to complete the initial configuration**.

    See chapter 2 of this guide.

5. **Configure storage, if applicable**.

    See chapter 3 of this guide for an overview of storage.

6. **Use the *HP ProLiant Storage Server Administration Guide* to complete any additional configuration tasks**.

Note: This installation guide and the *HP ProLiant Storage Server Administration Guide* provide information for several storage servers. Not all information is relevant to all storage servers. Exceptions are noted throughout the text. In addition, see Table 2.

Table 2 provides a quick reference for determining which sections of the storage server documentation apply to a particular model.

Table 2: Model quick reference

ProLiant Storage Server	OS version	Pre-configured storage	Feature Pack support	Print Services support	SAN support	Cluster support	iLO/ RILOE	NIC ports[2]
ML110	Express	Yes	Yes	No[1]	No	No	None	1
DL100	Standard	Yes	Yes	Yes	No	No	None	2
ML350	Standard	No	Yes	Yes	No	No	Optional RILOE	1
ML350 (internal SCSI)	Standard	No	Yes	Yes	No	No	Optional RILOE	1
ML370	Standard	No	Yes	Yes	No	No	Integrated iLO	1
DL380 (enterprise)	Enterprise	No	No	Yes	Yes	Yes	Integrated iLO	2
DL580	Enterprise	No	No	Yes	Yes	Yes	Integrated iLO	2
DL380 (standard)	Standard	No	Yes	Yes	No	No	Integrated iLO	2
DL380 (SCSI)	Standard	No	Yes	Yes	No	No	Integrated iLO	2
DL380 (SATA)	Standard	No	Yes	Yes	No	No	Integrated iLO	2

[1] Option kit available to enable print services support.

[2] Most servers support NIC teaming by default and include software support. The ML110 supports NIC teaming by adding the appropriate network cards and software from HP. The DL100 does not support NIC teaming.

See the QuickSpecs for specific hardware and software information.

System Configuration

2

Before beginning the configuration process, verify that the storage server is completely installed and that all cables and cords are connected.

It is important to read all of the supplied documentation before starting. Relevant documents include:

■ HP ProLiant Storage Server installation instructions for your model

■ *HP ProLiant Storage Server Administration Guide*

■ *HP ProLiant Storage Server Release Notes* (if required, this document will be available at http://www.hp.com/go/servers)

Deploying the storage server on the network

The default shipping configuration contains one or two 10/100/1000 integrated network interface controller (NIC) ports for client data access. NIC data ports also allow access to the WebUI that accompanies the product. Most management and administrative procedures can be accomplished via the WebUI.

IP networking and setup requirements

■ Windows-based PC running Microsoft Internet Explorer 5.5 (or later) on the same network segment as the storage server; this is used to set up and administer the storage server.

■ Additional Ethernet connection ports to client subnets (depending on network options ordered).

Collecting configuration information

Choose a host name and collect general information required to initialize the storage server for either dynamic host configuration protocols (DHCP) or non-DHCP configurations. This information is needed during configuration, as shown in Table 3. Become familiar with this information before attempting to configure the storage server.

Table 3: Configuration Information

Part A: To be completed for DHCP and non-DHCP configurations			
Server Host Name:			
Part B: To be completed for non-DHCP configurations only			
DNS Servers	IP Address		
1			
2			
3			
Storage Server NIC Port*	IP Address	Subnet Mask	Gateway Address
NIC 1			
NIC 2			
* Disable ports that will not be used. Each Ethernet port, whether standard or added, must be configured with a separate subnet.			
Part C: SNMP Information (optional)			
Trap Destination (IP Address) Manager Client:			
Management Traps Community String:			
System Management Community String:			

WebUI configuration

The WebUI is a graphical, easy-to-use application that gathers the necessary information for configuration. The WebUI can be accessed through three methods:

■ RapidLaunch method

■ Remote Browser method (using hostname)

■ Direct Attach method

Note: You can configure this system through the WebUI or manually through Remote Desktop or Windows Storage Server 2003 Desktop.

Note: The storage server can be deployed without a monitor, keyboard, and mouse. These ports are available and supported by the storage server, if used.

Method 1: RapidLaunch

Requirements to run the WebUI configuration application:

■ Windows-based PC loaded with Internet Explorer 5.5 (or later) on the same network segment as the storage server

■ RapidLaunch CD

Procedure

⚠ **Caution:** Do not power up the storage server until steps 1 through 5 are completed.

1. Connect the Ethernet cable to the network port of the storage server and the corresponding network segment.

2. Verify that the Windows-based PC client is connected to the same subnet as the storage server.

3. Power on the PC and wait until the operating system has completely loaded.

4. Insert the RapidLaunch CD into the CD-ROM drive of the PC.

5. The RapidLaunch CD should run automatically. If the program does not start up automatically:

   a. Select **Start > Run** on the Windows taskbar.

   b. Enter the following:

   `{CD ROM drive}:\setup.exe`

   Wait for the interface to start.

6. Go to the storage server and power it on. It is several minutes before the storage server is accessible on the network.

7. Return to the PC. Select StorageWorks NAS from the **Show** drop-down list to have RapidLaunch list all storage servers on the network, as shown in Figure 1.

Figure 1: RapidLaunch search screen
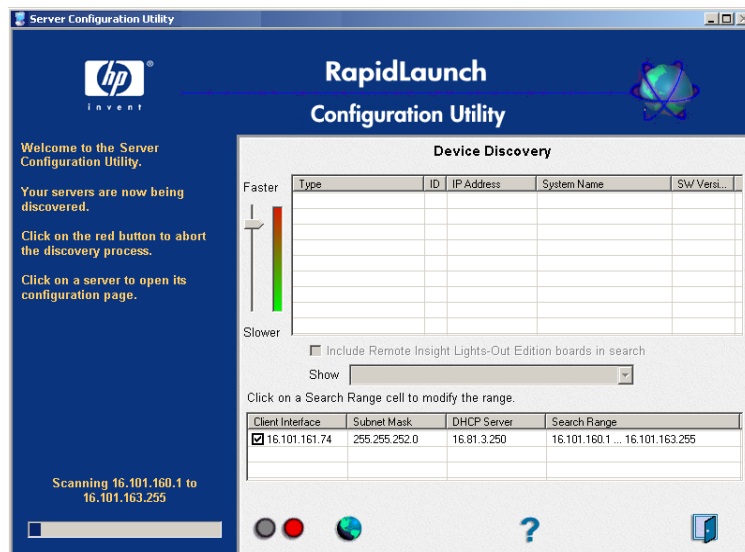
8. All the storage servers found on the network are displayed as shown in Figure 2. It can take several minutes for the storage server to be found on the network.

Note: The RapidLaunch utility refreshes periodically, looking for new devices on the network. Refresh the device list manually by clicking the refresh icon.
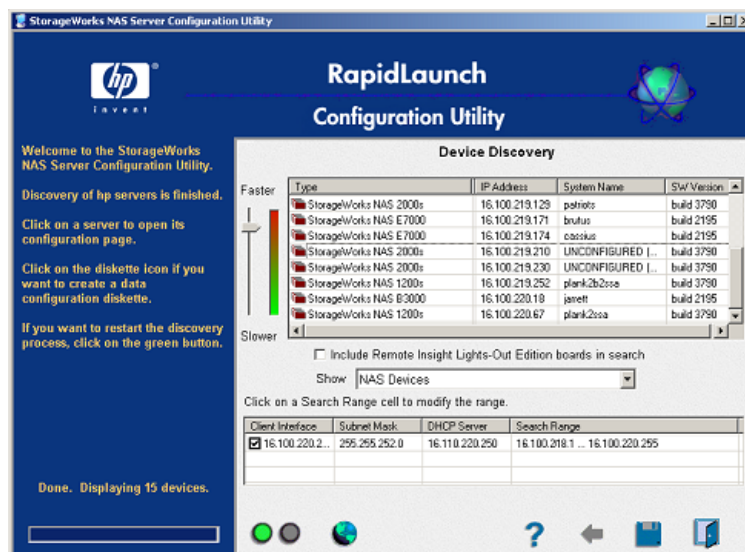

Figure 2: RapidLaunch device discovery screen

9. Select the unconfigured HP ProLiant Storage Server in the device list. If more than one displays, check the serial number in the *System Name* column by clicking the appropriate cell.

Note: Version 2.7.134 of the RapidLaunch utility displays the NAS 500s as a 1200s.

10. Login to the WebUI. This launches the WebUI configuration application (Rapid Startup) on the target storage server, as shown in Figure 3.

Note: The default login for the WebUI is `administrator` and the password is `hpinvent`. The WebUI uses the same login as the local administrator's account or an account with administrative privileges.

11. Go to "Rapid Startup Wizard configuration" on page 17 to complete the setup procedures.

Method 2: Remote browser (using hostname)

The storage server ships with DHCP enabled on the network port. If the system is placed on a DHCP enabled network and the serial number of the device is known, it can be accessed through a client running Internet Explorer 5.5 (or later) on that network, using the 3202 port of the device.

Requirements to run the WebUI configuration application:

■   Windows-based PC loaded with Internet Explorer 5.5 (or later) on the same segment as the storage server

■   DHCP-enabled network

■   Serial number of the storage server

Procedure

1. Connect the Ethernet cable to the network port of the storage server and the corresponding network segment.

2. Go to the storage server and power it on. It will be several minutes before the storage server is accessible on the network.

Note: The storage server responds when the storage server operating system has started.

3. Open Internet Explorer on the PC. Enter `https://`, the serial number of the storage server followed by a hyphen (-), and then `:3202`. Press **Enter**.

    Example: `https://D4059ABC3433-:3202`

Note: Substitute the server name for the serial number if a server name was previously set.

4. Login to the WebUI. This launches the WebUI configuration application (Rapid Startup) on the target HP ProLiant Storage Server, as shown in Figure 3.

Note: The default login for the WebUI is `administrator` and the password is `hpinvent`. The WebUI uses the same login as the local administrator's account or an account with administrative privileges.

5. Go to "Rapid Startup Wizard configuration" on page 17 to complete the setup procedures.

Method 3: Direct attach

You can access the WebUI using a monitor, mouse, and keyboard directly attached to the storage server.

Procedure

1. Connect the Ethernet cable to the network port of the storage server and the corresponding network segment.
2. Connect the monitor, mouse, and keyboard directly to the rear panel connectors of the storage server.
3. Power on the storage server.
4. Login into the device using the WebUI user name and password.

Note: The default login for the WebUI is `administrator` and the password is `hpinvent`. The WebUI uses the same login as the local administrator's account or an account with administrative privileges.

5. Open Internet Explorer to launch the WebUI configuration application (Rapid Startup) on the target storage server, as shown in Figure 3. If the WebUI does not launch, connect to the *LocalHost* and login to the WebUI.
6. Go to "Rapid Startup Wizard configuration" on page 17 to complete the setup procedures.

Rapid Startup Wizard configuration

This utility guides you through the configuration process.

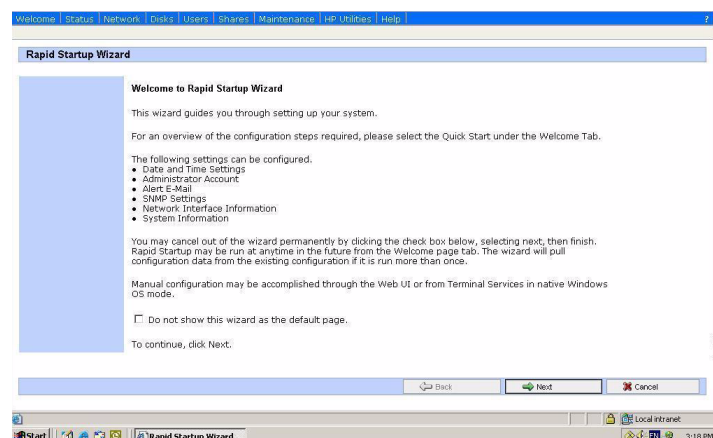Ensure that an Internet Explorer window open and the WebUI is at the Rapid Startup Wizard, as shown in Figure 3.

Figure 3: Rapid Startup wizard screen

Note: The Rapid Startup Wizard is the default page unless you complete the wizard or select the checkbox next to the text that reads, "Do not show this wizard as the default page."

Procedure

Using the information from Table 3, fill in the screens that follow.

1. Click **Next** to start the Rapid Startup Wizard (There may be a slight pause because the wizard is gathering information about the system and populating the fields.)

2. Configure the Date and Time Settings. Click **Next** to continue.

3. Configure the Administrator Account settings. Click **Next** to continue.

4. Configure the Alert E-mail settings. Click **Next** to continue.

5. Configure the SNMP Settings. Click **Next** to continue.

6. Configure the Network Interface Information for both NICs. Click **Next** to continue.

7. Configure the System Information. Click **Next** to continue.

8. Verify that the information is correct when the configuration review screen is displayed as shown in Figure 4.

Figure 4: Rapid Startup configuration review screen
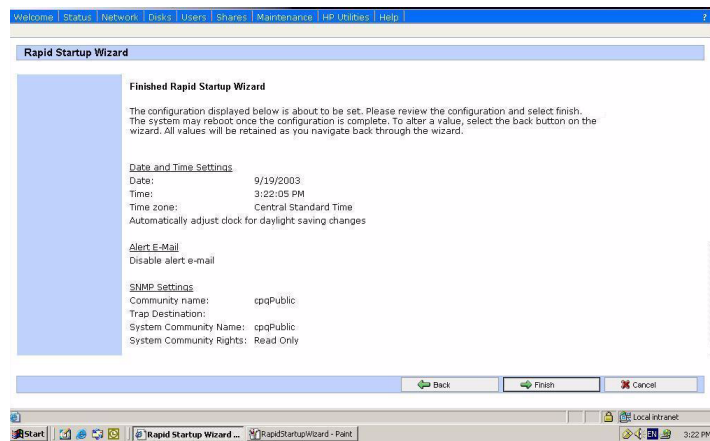
9. Click **Finish** to exit Rapid Startup. If a reboot is required, Rapid Startup displays a message that a reboot is occurring and the configuration information will be set.

The browser returns to the status page. The refresh can take several minutes if the device was restarted.

Note: After the Rapid Startup Wizard is complete, the Welcome page becomes the default page.

Completing basic setup

This completes the basic configuration of the HP ProLiant Storage Server, however, some computing environments can require additional settings and configuration as noted below.

Completing the system configuration

Most of these tasks can be completed using the WebUI. All procedures for the configuration tasks can be found in the *HP ProLiant Storage Server Administration Guide*.

■ Place the storage server into an Active Directory or Windows NT® 4.0 domain for ease of manageability (highly recommended).

■ Enable protocols such as NFS sharing, NCP, and/or AppleTalk.

■ Create shares corresponding to the protocols mentioned in the previous steps.

■ Configure shadow copies for creating point-in-time snapshots of data volumes.

■ Configure data replication software via Microsoft File Replication Services.

■ Enable and establish space usage quotas.

■ Configure DFS (Distributed File System) or publish the storage server shares into an already existing DFS structure.

■ Adjust logging for system, application, and security events.

■ Install additional third-party software, such as backup, anti-virus, or monitoring agents.

■ Configure UNIX® user and group mappings.

■ Create and verify a full storage server system backup before putting the system into production.

Cluster setup

If your storage server model supports clustering, see the *HP ProLiant Storage Server Administration Guide* for complete details on cluster setup.

Storage Management

3

Overview

This chapter provides an overview of the components that make up the HP ProLiant Storage Server storage structure.

The storage server is configured at the factory with default system settings and with the operating system installed. The information in this chapter refers to *data* storage that, except for the 100 series, does not come pre-carved or RAID configured.

> ⚠️ **Caution:** This section on storage management is required reading material for the storage server administrator. This section develops the concepts and requirements that serve as the basis for successfully using an HP ProLiant Storage Server. Failure to read this section and the appropriate sections on storage management in the administration guide may lead to data loss or file corruption.

Storage management elements

Storage is divided into four major divisions:

■ Physical storage elements

■ Logical storage elements

■ File system elements

■ File sharing elements

Each of these elements is composed of the previous level's elements.

Storage Management example

The MSA1000 storage and the associated Array Configuration Utility are used in the example. The Array Storage device in use impacts the devices in use and the relevant storage management software required.
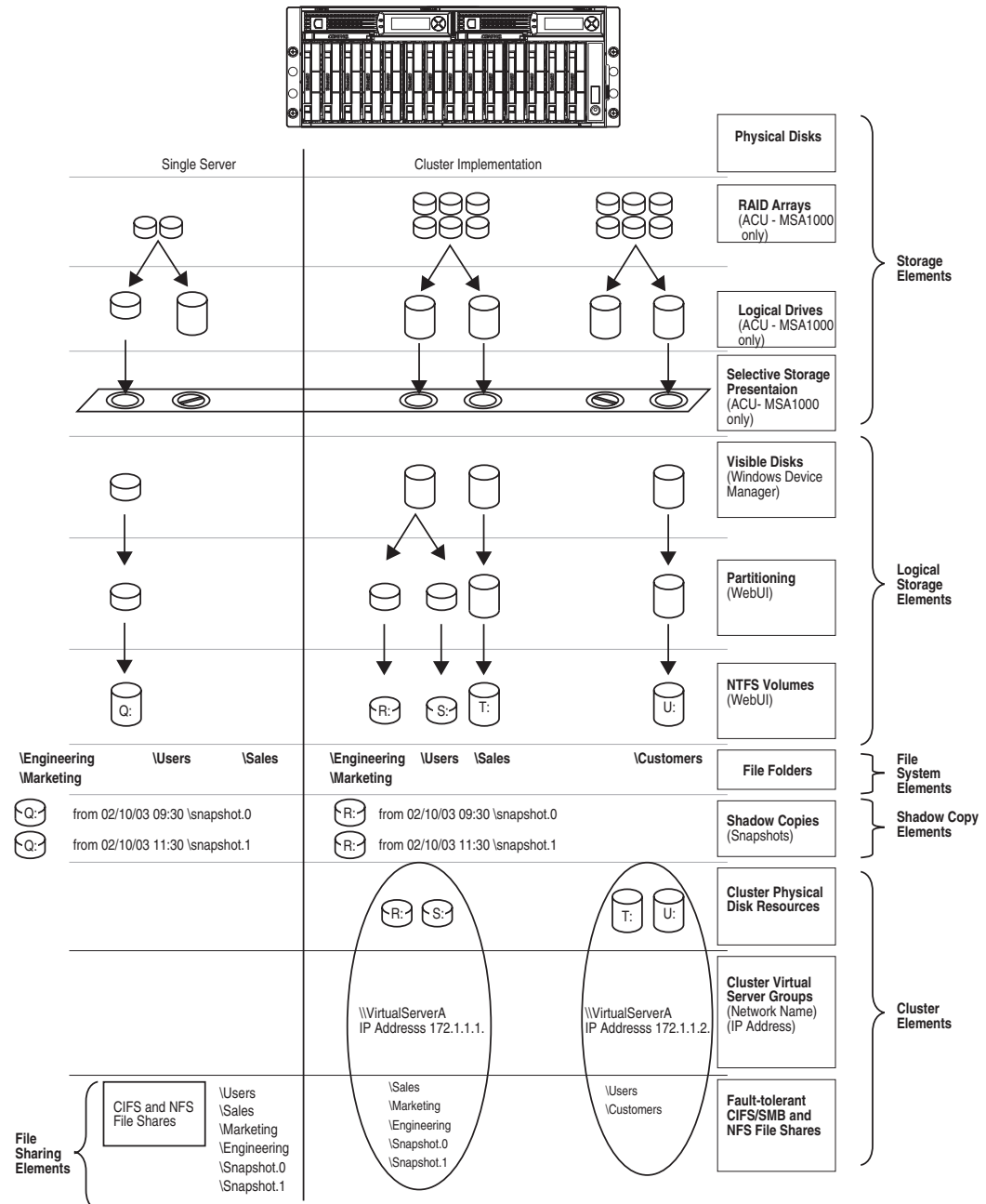

Figure 5: Storage Management process example

Physical storage elements

The lowest level of storage management occurs at the physical drive level. Minimally, choosing the best disk carving strategy includes the following policies:

■ Analyze current corporate and departmental structure.

■ Analyze the current file server structure and environment.

■ Plan properly to ensure the best configuration and use of storage.

— Determine the desired priority of fault tolerance, performance, and storage capacity.

— Use the determined priority of system characteristics to determine the optimal striping policy and RAID level.

■ Include the appropriate number of physical drives in the arrays to create logical storage elements of desired sizes.

Arrays

With an array controller installed in the system, the capacity of several physical drives can be logically combined into one or more logical units called arrays. When this is done, the read/write heads of all the constituent physical drives are active simultaneously, dramatically reducing the overall time required for data transfer.

Note: Depending on the storage server model, array configuration may not be possible or necessary.
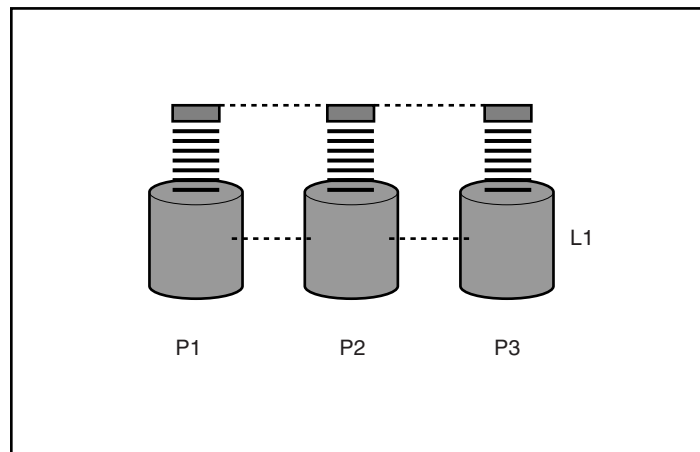

Figure 6: Configuring the physical drives into an array dramatically improves read/write efficiency

Because the read/write heads are active simultaneously, the same amount of data is written to each drive during any given time interval. Each unit of data is termed a block. The blocks form a set of data stripes over all the hard drives in an array, as shown in Figure 7.
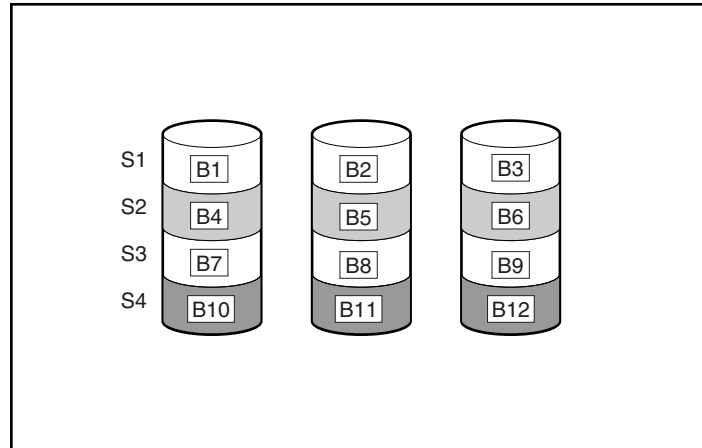
Figure 7: RAID 0 (data striping) (S1-S4) of data blocks (B1-B12)

For data in the array to be readable, the data block sequence within each stripe must be the same. This sequencing process is performed by the array controller, which sends the data blocks to the drive write heads in the correct order.

A natural consequence of the striping process is that each hard drive in a given array contains the same number of data blocks.

Note: If one hard drive has a larger capacity than other hard drives in the same array, the extra capacity is wasted because it cannot be used by the array.

Fault tolerance

Drive failure, although rare, is potentially catastrophic. For example, in Figure 7 using simple striping, failure of any hard drive leads to failure of all logical drives in the same array, and hence to data loss.

To protect against data loss from hard drive failure, storage servers should be configured with fault tolerance. HP recommends adhering to RAID 5 configurations.

The table below summarizes the important features of the different kinds of RAID supported by the Smart Array controllers. The decision chart in the following table can help determine which option is best for different situations.

Table 4: Summary of RAID Methods

	RAID 0 Striping (no fault tolerance)	RAID 1+0 Mirroring	RAID 5 Distributed Data Guarding	RAID ADG Advanced Data Guarding
Maximum number of hard drives	N/A	N/A	14	Storage system dependent
Tolerant of single hard drive failure?	No	Yes	Yes	Yes
Tolerant of multiple simultaneous hard drive failure?	No	For RAID 1+0, if the failed drives are not mirrored to each other	No	Yes (two drives can fail)

Online Spares

Further protection against data loss can be achieved by assigning an online spare (or hot spare) to any configuration except RAID 0. This hard drive contains no data and is contained within the same storage sub system as the other drives in the array. When a hard drive in the array fails, the controller can then automatically rebuild information that was originally on the failed drive onto the online spare. This quickly restores the system to full RAID level fault tolerance protection. However, unless RAID ADG is being used, which can support two drive failures in an array, in the unlikely event that a third drive in the array should fail while data is being rewritten to the spare, the logical drive still fails.

Note: For configurable storage servers, storage limitations are based on the type of SAN the storage server is connected to. See the individual SAN documentation for limitations of Windows Storage Server 2003.

Logical storage elements

Logical storage elements consist of those components that translate the physical storage elements to file system elements. The storage server utilizes the WebUI to manage the various types of disks presented to the file system. The WebUI has two types of LUN presentation, basic disk and dynamic disk. Each of these types of disk has special features that enable different types of management.

Logical drives (LUNs)

While an array is a physical grouping of hard drives, a logical drive consists of components that translate physical storage elements into file system elements.

It is important to note that a LUN may extend over (span) all physical drives within a storage controller subsystem, but cannot span multiple storage controller subsystems.
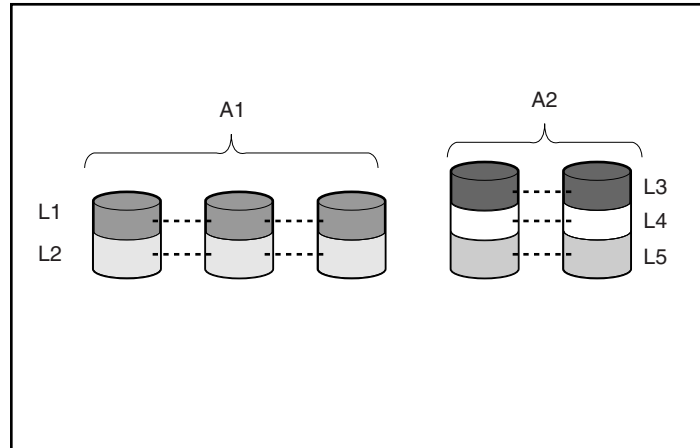
Figure 8: 2 arrays (A1, A2) and 5 logical drives (L1 through L5) spread over 5 physical drives

Note: This type of configuration may not apply to all storage servers and serves only as an example.

Through the use of basic disks, primary partitions or extended partitions can be created. Partitions can only encompass one LUN. Through the use of dynamic disks, volumes can be created that span multiple LUNs. The WebUI can be used to convert disks to dynamic and back to basic, and manage the volumes residing on dynamic disks. Other options include the ability to delete, extend, mirror, and repair these elements.

Note: See the section "Dynamic growth" in the administration guide for additional information on LUN extension and use by the operating system.

Partitions

Partitions exist as either Primary Partitions or Extended Partitions and can be composed of only one basic disk no larger than 2 TB. Basic disks can also only contain up to four primary partitions, or three primary partitions and one extended partition. In addition, the partitions on them cannot be extended beyond the limits of a single LUN. Extended partitions allow the user to create multiple logical drives. These partitions or logical disks can be assigned drive letters or be mounted as mount points on existing disks. If mount points are utilized, it should be noted that Services for UNIX does not support mount points at this time. The use of mount points in conjunction with NFS shares is not supported.

Volumes

When planning dynamic disks and volumes there is a limit to the amount of growth a single volume can undergo. Volumes are limited in size and are limited to no more than 32 separate LUNs with each LUN not exceeding 2 terabytes (TB). Volumes also cannot exceed 64 TB of disk space.

The RAID level of the LUNs included in a volume must be considered. All of the units that make up a volume should have the same high-availability characteristics. In other words, the units should all be of the same RAID level. For example, it would be a bad practice to include both a RAID 1+0 and a RAID 5 array in the same volume set. By keeping all the units the same, the entire volume retains the same performance and high-availability characteristics,

making managing and maintaining the volume much easier. If a dynamic disk goes offline, the entire volume dependent on the one or more dynamic disks is unavailable. There could be a potential for data loss depending on the nature of the failed LUN.

Volumes are created out of the dynamic disks and can be expanded on the fly to extend over multiple dynamic disks if they are spanned volumes. However, after a type of volume is selected it cannot be altered. For example, a spanning volume cannot be altered to a mirrored volume without deleting and recreating the volume, unless it is a simple volume. Simple volumes can be mirrored or converted to spanned volumes. Fault tolerant disks cannot be extended either. Therefore, selection of the volume type is important. The same performance characteristics on numbers of reads and writes apply when using fault tolerant configurations as is the case with controller based RAID. These volumes can also be assigned drive letters or be mounted as mount points off existing drive letters. In general, HP recommends utilizing the Array controller for the management of fault tolerance over the use of Windows Storage Server 2003 software RAID because it places an additional level of operating system overhead on volumes. If mount points are utilized, it should be noted that Services for UNIX does not support mount points at this time.

The administrator should carefully consider how the volumes will be carved up and what groups or applications will be using them. For example, putting several storage-intensive applications or groups into the same dynamic disk set would not be efficient. These applications or groups would be better served by being divided up into separate dynamic disks, which could then grow as their space requirements increased, within the allowable growth limits.

Note: Dynamic disks cannot be used for clustering configurations because Microsoft Cluster only supports basic disks.

More detailed information regarding the WebUI for disk management activities can be found in the *HP ProLiant Storage Server Administration Guide*.

File System Elements

File system elements are composed of the folders and subfolders that are created under each Logical Storage element (partitions, logical disks, and volumes). Folders are used to further subdivide the available file system providing another level of granularity for management of the information space. Each of these folders can contain separate permissions and share names that can be used for network access. Folders can be created for individual users, groups, projects, and so on.

Detailed information on file system elements can be found in the administration guide.

File-Sharing Elements

The storage server supports several file sharing protocols, including DFS, NFS, FTP, HTTP, and Microsoft SMB. On each folder or Logical Storage element, different file sharing protocols can be enabled using specific network names for access across a network to a variety of clients. Permissions can then be granted to those shares based on users or groups of users in each of the file sharing protocols.

Volume Shadow Copy Service Overview

The Volume Shadow Copy Service (VSS) provides an infrastructure for creating point-in-time snapshots (shadow copies) of volumes. VSS supports 64 shadow copies per volume.

Shadow Copies of Shared Folders resides within this infrastructure and helps alleviate data loss by creating shadow copies of files or folders that are stored on network file shares at pre-determined time intervals. In essence, a shadow copy is a previous version of the file or folder at a specific point in time.

By using shadow copies, a storage server can maintain a set of previous versions of all files on the selected volumes. End users access the file or folder by using a separate client add-on program, which enables them to view the file in Windows Explorer.

Shadow copies should not replace the current backup, archive, or business recovery system, but they can help to simplify restore procedures. For example, shadow copies cannot protect against data loss due to media failures, however, recovering data from shadow copies can reduce the number of times needed to restore data from tape.

Detailed information on Shadow Copies can be found in the administration guide.

Utilizing Storage Elements

No matter which type of storage element is created in the WebUI, the last step in creating the element is determining its drive letter or mount point and formatting the element. Each element created can exist as a drive letter(s), assuming one is available and/or as mount points off of an existing folder of a drive letter. Either method is supported. However, mount points can not be utilized for shares that will be shared using Microsoft Services for Unix (NFS). They can be setup with both but the use of the mount point in conjunction with NFS shares causes instability with the NFS shares.

Formats consist of NTFS, FAT32, and FAT and all three types can be used on the storage server. However, the Volume Shadow Copy Service can only utilize volumes that are NTFS formatted. Also, quota management is possible only on NTFS.

Clustered Server Elements

Select storage servers support clustering. The HP ProLiant Storage Server supports several file-sharing protocols, including DFS, NFS, FTP, HTTP, and Microsoft SMB. Only NFS, FTP, and Microsoft SMB are cluster-aware protocols. HTTP can be installed on each node but the protocols cannot be set up through cluster administrator, nor will they failover during a node failure.

> **Caution:** AppleTalk shares should not be created on clustered resources as this is not supported by Microsoft Clustering, and data loss may occur.

Network names and IP address resources for the clustered file share resource can also be established for access across a network to a variety of clients. Permissions can then be granted to those shares based on users or groups of users in each of the file sharing protocols.

If your storage server model supports clustering, see the *HP ProLiant Storage Server Administration Guide* for complete details on cluster setup.

Storage for 100 series HP ProLiant Storage Servers

The 100 series HP ProLiant Storage Servers ship pre-configured. No additional storage configuration is needed.

Physical drive configuration

Each 100 series storage server comes with four SATA hard drives.

■ The ProLiant ML110 Storage Server hard drives are non-hot pluggable.

■ The ProLiant DL100 Storage Server hard drives are hot pluggable.

The drives are configured by default into three logical disks at the SATA controller level as follows:

Table 5: Hard drive configuration

Logical Disk	RAID	Size/Allocation
1	RAID 1	9 GB across physical drive 0, 1
2	RAID 1	9 GB across physical drive 2, 3
3	RAID 5	Remaining physical disk space across all physical drives

Figure 9: Hardware RAID

Note: In Adaptec Storage Manager, logical disks are labeled 1, 2, and 3. In Disk Manager, logical disks are displayed as 0, 1, and 2.

The primary OS logical drive resides on disk 0 and is mirrored on disk 1 while the secondary OS logical drive resides on disk 2 and is mirrored on disk 3. If a single disk failure occurs, the system still functions off the mirrored disk. If the primary OS becomes corrupted and un-bootable, the secondary OS is available for data backup prior to using the Quick Restore DVD to restore the system to the factory default state.

The data volume is configured as a hardware RAID 5 based basic partition across all four drives. This ensures redundancy in the event of a drive failure. The data volume is accessible by both the primary OS and secondary OS.

Refer to the administration guide for additional information.

Disk Manager

The 100 series storage servers use Microsoft Disk Manager (DM) for managing the various types of disks presented to the file system. Disk Manager has two types of disk presentations: basic disk and dynamic disk. Each type of disk has special features that enable different types of management. The 100 series storage server uses all 3 disks as presented to it from the physical storage layer. The two RAID 1 disks are used for housing the primary and secondary OS basic partitions. The single RAID 5 disk houses the data volume on a basic partition.

Disk partitioning and RAID configuration

The four hard drives included in the 100 series storage servers are configured for hardware RAID fault tolerance using the Adaptec 2410SA SATA RAID Controller.

■ The primary OS logical drive is configured as a 9 GB RAID 1 mirror spanning drives 0 and 1.

■ The secondary OS logical drive is configured as a 9 GB RAID 1 mirror spanning drives 2 and 3.

■ The data volume is configured as a RAID 5 volume spanning the remaining space across all four drives.

Table 6: RAID configuration by hard drives

Hard Drive 0	Partition C: 9GB Primary OS	Partition F: User Data in RAID-5
Hard Drive 1	Partition C: 9GB Primary OS Mirror	Partition F: User Data in RAID-5
Hard Drive 2	Partition D: 9GB Backup OS	Partition F: User Data in RAID-5
Hard Drive 3	Partition D: 9GB Backup OS Mirror	Partition F: User Data in RAID-5

Table 7: RAID configuration by logical drives

Logical Drive 1	Partition C: 9GB Primary OS - RAID 1 Mirror spanning physical drives 0 and 1
Logical Drive 2	Partition D: 9GB Secondary OS - RAID 1 Mirror spanning physical drives 2 and 3
Logical Drive 3	Partition F: Data volume using remaining disk space - RAID 5 volume spanning physical drives 0, 1, 2, and 3

Note: In Adaptec Storage Manager, logical disks are labeled 1, 2, and 3. In Disk Manager, logical disks are displayed as 0, 1, and 2. The default configuration for the data volume can be modified using the Disk Management utility. Refer to the administration guide for additional information.

The BIOS supports the following default boot sequence:

1. CD-RW/DVD-ROM

2. HDD 0, 1, 2

Note: This is logical drive 1, 2, and 3 as presented by the SATA RAID controller.
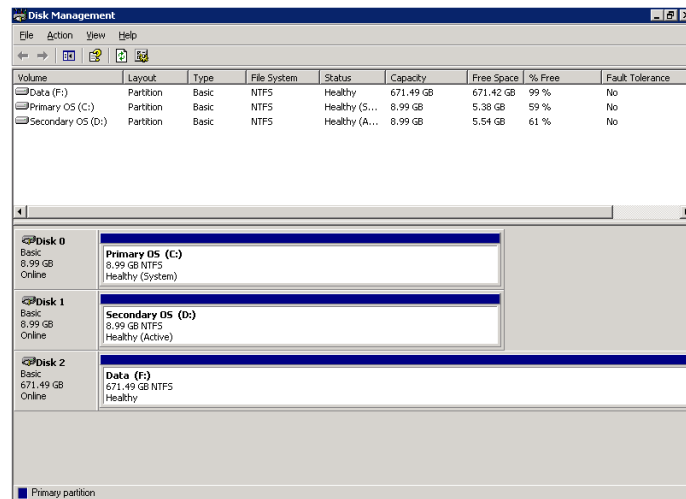
3. PXE (network boot)

Figure 10: Disk management, partitioning

Under normal circumstances, the 100 series storage server boots up from the primary OS logical drive. If the system experiences a drive failure, the Adaptec 2410SA sounds an audible alert to inform the user of a drive failure.

■ If a single drive failure occurs, it is transparent to the OS.

■ If a second drive fails, the data volume is lost and must be restored from backup.

When the primary OS has a failure such as system files becoming corrupted, registry corrupted, and the system hangs during boot, the system should be run from the secondary OS. To run the system from the secondary OS:

1. Power down the unit.

2. Connect a monitor, keyboard, and mouse directly to the rear of the unit.

3. Power on the unit.

4. During boot up, select to use the secondary partition.

The user should backup their user data and then use the Quick Restore DVD to restore the system to the factory default state as soon as conveniently possible.

Storage for 300 series and 500 series ProLiant storage servers

The 300 series and 500 series storage servers ship pre-configured for the Operating System only. Additional storage configuration is needed. Depending on the type of storage server purchased, storage configuration can involve local storage configuration via the HP Array Configuration Utility or SAN management tools.

Physical drive configuration

Each 300 series and 500 series storage server comes with two hot-pluggable hard drives for the Operating System only. The drives are configured by default into two logical disks at the Smart Array controller level as follows:

Table 8: Hard drive configuration

Logical Disk	RAID	Size/Allocation
1	RAID 1	27 GB across physical drive 0, 1
2	RAID 1	2 GB across physical drive 0, 1

Figure 11: Hardware RAID

Note: In the HP Array Configuration Utility, logical disks are labeled 1 and 2. In Disk Manager, logical disks are displayed as 0 and 1.

Data volumes are not carved at the factory nor by the Quick Restore DVD, and must be configured manually by the end user. Refer to the *HP ProLiant Storage Server Administration Guide* for additional information.

Regulatory Compliance Notices

A

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (personal computers, for example). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

Class A equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Class B equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

■ Reorient or relocate the receiving antenna.

■ Increase the separation between the equipment and receiver.

■ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

■ Consult the dealer or an experienced radio or television technician for help.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Declaration of conformity for products marked with the FCC logo - United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, contact:

Hewlett-Packard Company

P. O. Box 692000, Mail Stop 530113

Houston, Texas 77269-2000

Or, call

1-800- 652-6672

For questions regarding this FCC declaration, contact:

Hewlett-Packard Company

P. O. Box 692000, Mail Stop 510101

Houston, Texas 77269-2000

Or, call

(281) 514-3333

To identify this product, refer to the Part, Series, or Model number found on the product.

Canadian Notice (Avis Canadien)

Class A equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice

$C \in$

Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

■ EN 55022 (CISPR 22) - Electromagnetic Interference

■ EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11) - Electromagnetic Immunity

■ EN61000-3-2 (IEC61000-3-2) - Power Line Harmonics

■ EN61000-3-3 (IEC61000-3-3) - Power Line Flicker

■ EN 60950 (IEC 60950) - Product Safety

BSMI Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能
會造成射頻干擾，在這種情況下，使用者會被要求採
取某些適當的對策。

Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文を
お読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準
に基づくクラスB情報技術装置です。この装置は、家庭環境で使用すること
を目的としていますが、この装置がラジオやテレビジョン受信機に近接して
使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に
基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波
妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず
るよう要求されることがあります。

Japanese Power Cord Notice

製品には、同梱された電源コードをお使い下さい。
同梱された電源コードは、他の製品では使用出来ません。

Battery Replacement Notice

⚠️ **WARNING:** The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose the battry to tempuratures higher than 60°C (140°F).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.

Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to HP, an authorized HP Partner, or their agents.

For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

Taiwan Battery Recycling Notice

廢電池請回收   The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, giveaway or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.

Electrostatic Discharge

B

To prevent damage to the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

■   Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ± 10 percent resistance in the ground cords. To provide proper grounding, wear the strap snug against the skin.

■   Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.

■   Use conductive field service tools.

■   Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

Note: For more information on static electricity, or for assistance with product installation, contact your authorized reseller.

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